# Commentary: Artificial intelligence-based screening of retina

Artificial intelligence (AI)-based screening for retinal diseases has a tremendous potential that is underutilized. While the technology offers a substantial advantage in terms of large-scale application, reproducibility, its role as a stand-alone tool, in the absence of a doctor is highly debatable. The evolving patient perspective toward its acceptance is a bottleneck, which this study aims to address.

Patients' acceptability of AI for screening has been high in general, as confirmed in this study as well.[1] AI is often seen as a magic bullet, and particularly in Indian patients, often a lot of trust is placed in such technology. A large part of such faith is due to the message conveyed about the technology in popular media.

However, certain drawbacks of AI are likely to affect patient adaptation of the same. Detailed informed consent, explaining to the patient that such technology may go wrong, is crucial to the successful large-scale application of such technology. It must be noted that mistakes made by AI may often be obvious to human experts, and the reason for error may be unexplainable. This must be told to any patient undergoing such screening in no uncertain terms. Further, in the current study,[2] the authors report a 96% positive predictive value and 89% negative predictive value in AI-based screening. A retrospective analysis of the 4% positive patients where the finding was missed and 11% negative patients who were wrongly made to undergo referral due to AI would be extremely useful to understand patient behavior in such cases. The medicolegal aspects also need to be further studied, would the developing company, or deploying authority, be willing to take responsibility in case such a patient wishes to file a lawsuit.

In a resource-limited setting, like rural India, where trained manpower is hard to deploy, an AI-based screening of retina forms a strong use case, particularly to triage patients who may need further attention. Here, screening with an AI-enabled device may well be the only possibility to be able to screen such patients, as in the absence of such technology, screening may not be feasible at all. Few points are worthy of mention in such a scenario. First, most of such algorithms have been developed from data derived from a hospital setting, and thus would need rigorous re-validation in the setting of a population that has never been screened. In this context, it is important that the model be generalizable, and stress testing to limit underspecification is important in evaluating the AI algorithm to be deployed.[3] Second, a strong referral system needs to be built that is capable of treating patients once detected, without a significant lag. Third, a workable business model is required to ensure implementation of such a system on ground. All the same, an honest comparison, and advantages of examination by an ophthalmologist need to be made aware to anyone who may choose an AI based screening in place of an in person retina exam.

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## References

1. Keel S, Lee PY, Scheetz J, Li Z, Kotowicz MA, MacIsaac RJ, *et al*. Feasibility and patient acceptability of a novel artificial intelligence-based screening model for diabetic retinopathy at endocrinology outpatient services: A pilot study. Sci Rep 2018;8:4330.
2. Shah P, Mishra D, Shanmugam M, Vighnesh MJ, Jayaraj H. Acceptability of artificial intelligence-based retina screening in general population. Indian J Ophthalmol 2022;70:1140-4.
3. Eche T, Schwartz LH, Mokrane FZ, Dercle L. Toward generalizability in the deployment of artificial intelligence in radiology: Role of computation stress testing to overcome underspecification. Radiol Artif Intell 2021;3:e210097.



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